



UDC 3200 Application Note

Current Output Calibration

Introduction

Calibrate the controller so that the output provides the proper amount of current over the desired range. The controller can provide an output current range of from 0 to 21 milliamperes and is usually calibrated at 4 mA for 0 % of output and 20 mA for 100 % of output, or any other values between 0 mA and 21 mA. It is not necessary to re-calibrate the controller in order to change from 4 to 20 mA operation over to 0 to 20 mA operation, a simple configuration change is all that is required.

Equipment Needed

You will need a standard shop type milliammeter, with whatever accuracy is required, capable of measuring 0 to 20 milliamps.

Calibrator Connections

Refer to Figure 1 and wire the controller according to the procedure given in Table 1.

Table 1 Set Up Wiring Procedure for Current Output

Step	Action
1	Apply power and allow the controller to warm up 30 minutes before you calibrate.
2	Set LOCK in the Tuning Set Up group to NONE.
3	Tag and disconnect the field wiring, at the rear of the controller, from terminals 21 (-) and 19 (+). See Figure 1.
4	Connect a milliammeter across these terminals.

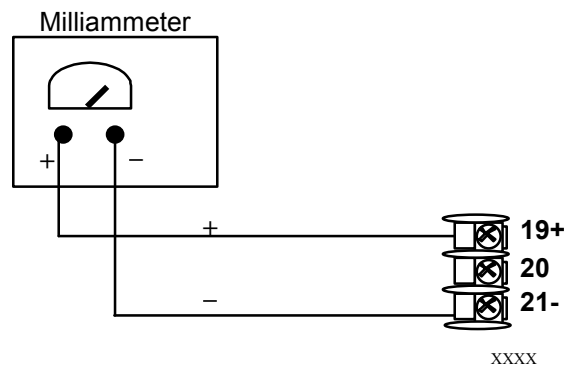


Figure 1 Wiring Connections for Calibrating Current Proportional Output








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Procedure

The procedure for calibrating the Current Output is listed in Table 2. Make sure LOCK in the Tuning Set Up group is set to **NONE**.

Table 2 Current Output Calibration Procedure

Step	Operation	Press	Result
1	Enter Calibration Mode	 until you see	<i>Upper Display = CALIB</i> <i>Lower Display = CURRENT</i>
2	Calibrate 0 %	 ▲ or ▼	You will see: <i>Upper Display = A Value</i> <i>Lower Display = ZERO VAL</i> Until the desired 0 % output is read on the milliammeter, use the values shown below depending on the action of your controller. Normally, this will be the setting that produces 4 mA.
3	Calibrate 100 %	 ▲ or ▼	This stores the 0 % value and you will see: <i>Upper Display = A Value</i> <i>Lower Display = SPAN VAL</i> Until the desired 100 % output is read on the milliammeter, use the values shown below depending on the action of your controller. Normally, this will be the setting that produces 20 mA.
4	Exit the Calibration Mode	 	The controller stores the span value. To exit the calibration mode.



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Auxiliary Output Calibration

Introduction

Calibrate the controller so that the auxiliary output provides the proper amount of current over the desired range. The controller can provide an auxiliary current output range of from 0 mA to 21 mA and is usually calibrated at 4 mA for 0 % of output and 20 mA for 100 % of output or any other values between 0 mA and 21 mA. It is not necessary to re-calibrate the controller in order to change from 4 to 20 mA operation over to 0 to 20 mA operation, a simple configuration change is all that is required.

Equipment Needed

You will need a calibrating device with whatever accuracy is required, capable of measuring 0 to 20 mA.

Calibrator Connections

Refer to Table 3 and wire the controller according to the procedure given in Figure 2.

Table 2 Set Up Wiring Procedure for Auxiliary Output

Step	Action
1	Apply power and allow the controller to warm up 30 minutes before you calibrate.
2	Set LOCK in the Tuning Set Up group to NONE.
3	Tag and disconnect the field wiring, at the rear of the controller, from terminals 12 (+) and 13 (-).
4	Connect a milliammeter across these terminals.

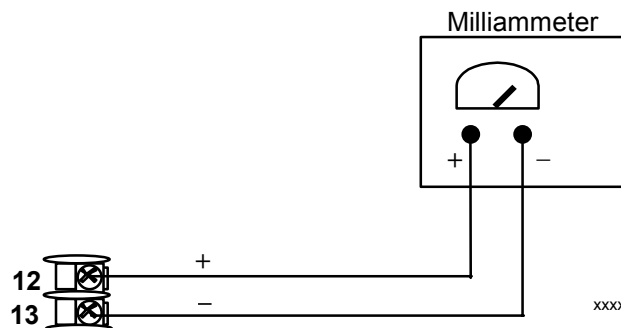


Figure 2 Wiring Connections for Calibrating Auxiliary Output








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Procedure

The procedure for calibrating the auxiliary output is listed in Table 4.
 Make sure “LOCK” in the Tuning Set Up group is set to “NONE”

Table 4 Auxiliary Output Calibration Procedure

Step	Operation	Press	Result
1	Enter Calibration Mode	 until you see	<i>Upper Display = CALIB</i> <i>Lower Display = AUX OUT</i>
2	Calibrate 0 %	 ▲ or ▼	You will see: <i>Upper Display = A Value</i> <i>Lower Display = ZERO VAL</i> until the desired 0 % output is read on the milliammeter. Normally, this will be the setting that produces 4 mA.
3	Calibrate 100 %	 ▲ or ▼	To store the 0 % value you will see: <i>Upper Display = A Value</i> <i>Lower Display = SPAN VAL</i> until the desired 100 % output is read on the milliammeter. Normally, this will be the setting that produces 20 mA.
4	Exit the Calibration Mode	 	The controller stores the span value. To exit the calibration mode.



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Position Proportional and Three Position Step Output Calibration

Position Proportional control

Position Proportional Control Output Models

This model must have its output calibrated per the entire procedure to ensure the displayed output (slidewire position) agrees with the final control element position.

Three position step control

Three Position Step Control Output Models not using slidewire feedback.

This model only requires that the “Motor Time be entered in the Out Alg group.

Three Position Step Control Models using slidewire feedback.

This model must have its output calibrated per the entire procedure to ensure the displayed output (slidewire position) agrees with the final control element position.

Equipment needed

None.

Connections

Apply power and leave all field wiring connected to the rear terminals.

Procedure

The procedure for calibrating the Three Position Step control output is listed in Table 5 for Three Position Step Control (3Pstep), these prompts *only* appear when “SLIDEW” is selected in the INPUT 2 Setup group. For Position Proportional Control, the Output algorithm must also be configured for “POSITON”.








Make sure LOCKOUT in Tuning Set Up group is set to NONE.

ATTENTION For Three Position Step Control (3Pstep), these prompts *only* appear when “SLIDEW” is selected in the INPUT 2 Setup group. For Position Proportional Control, the Output algorithm must also be configured for “POSITON”. The Motor Time must be entered in the Output Algorithm Group for both Position Proportional or for 3Pstep control.



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Table 5 Position Proportional and Three Position Step Output Calibration Procedure

Step	Description	Press	Action						
1	Enter Calibration Mode		<p>until you see <i>Upper Display = CALIB</i> <i>Lower Display = POS PROP</i> continued</p>						
2	Select Automatic or Manual Calibration		<p>until you see: <i>Upper Display = DISABLE</i> <i>Lower Display = POS PROP</i></p> <p>You can calibrate the controller output manually or let the controller calibrate the output automatically.</p> <p>If the slidewire has never been calibrated, you must use DO AUTO first. In the "Automatic Calibration Mode" (DO AUTO), the controller relays automatically move the motor in the proper direction.</p> <p>If desired, however, the motor may be manually positioned to 0 % and 100 % positions. Disconnect the relay wires. Use DO MAN. In the "Manual Calibration Mode" (DO MAN), the motor does not move. Instead, the existing 0 % and 100 % values may be changed with the  or  key.</p> <p> or  to select automatic or manual calibration. <i>Upper Display = DO AUTO or DO MAN</i> <i>Lower Display = POS PROP</i></p> <table border="1" data-bbox="816 1224 1352 1329"> <thead> <tr> <th>If you select...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>DO AUTO</td> <td>go to Step 4</td> </tr> <tr> <td>DO MAN</td> <td>go to Step 6</td> </tr> </tbody> </table>	If you select...	Then...	DO AUTO	go to Step 4	DO MAN	go to Step 6
If you select...	Then...								
DO AUTO	go to Step 4								
DO MAN	go to Step 6								
3	DO AUTO Set 0 % value		<p>The decrement relay is turned on to move the motor to 0 % position. <i>Upper Display =</i> (counts of slidewire feedback 0-3000) <i>Lower Display = ZERO VAL</i></p> <p>When the motor stops, the display should stop counting, then go to the next step.</p>						

ATTENTION When calibration is terminated, this selection reverts to DISABL.



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Step	Description	Press	Action
4	DO AUTO Set 100 % value		The increment relay is turned on to move the motor to 100 % position. <i>Upper Display =</i> (counts of slidewire feedback 0-3000) <i>Lower Display = SPAN VAL</i> When the motor stops, the display should stop counting, then, go to Step 8.
5	DO MAN Set 0 % value		You will see: <i>Upper Display =</i> (the existing zero calibration value in counts)) <i>Lower Display = ZERO VAL</i>
		^ or v	until the desired zero value is reached in the upper display. <i>Upper Display =</i> (the desired zero calibration value) <i>Lower Display = ZERO VAL</i>
6	DO MAN Set 100 % value		The controller will store the 0 % value and you will see: <i>Upper Display =</i> (the existing span calibration value in counts)) <i>Lower Display = SPAN VAL</i>
		^ or v	until the desired span value is reached in the upper display. <i>Upper Display =</i> (the desired span calibration value) <i>Lower Display = SPAN VAL</i>
7	Exit the Calibration Mode	  or 	The controller will store the 100 % value. To exit the calibration mode